

ACCORDINGLY, WHAT IS CLAIMED IS:

1. A tooling assembly comprising:

- Sub
B1
- 5
- 10
- 15
- 20
- 25
- (a) a product material inlet;
 - (b) a product material channel in communication with the product material inlet;
 - (c) a product cavity in communication with the product material channel;
 - (d) the product material inlet, channel, and product cavity define a flow path for a product material to flow therein;
 - (e) a flow device assembly, a portion of the flow device assembly is in communication with the flow path;
 - (f) a flow device actuation assembly, the flow device actuation assembly is operatively associated with the flow device assembly, operation of the flow device actuation assembly controls the portion of the flow device assembly which is in communication with the flow path, the flow device actuation assembly is thereby operative to alter the posture of said portion with respect to the channel;
- whereby as product material flows in the flow path from the inlet to the product cavity, the flow device actuation assembly is operative to control the pressure, volumetric, and/or mass flow rate conditions of the product material filling the product cavity.

2. A tooling assembly, comprising a product material inlet:

- 5 (a) first and second product material channels in communication with the product material inlet;
first and second product cavities in communication with the first and second product material channels, respectively;
- 10 (b) the product material inlet, first and second channels, and first and second product cavities define a flow path for a product material to flow therein;
- (c) a plurality of flow device assemblies each comprising a portion in communication with the flow path;
- 15 (d) a plurality of flow device actuation assemblies, the flow device actuation assemblies are operatively associated with a respective flow device assembly, operation of a flow device actuation assembly controls the portion of its respective flow device assembly which is in communication with the flow path, thereby altering
- 20 the flow path by changing the posture of said portion with respect to the channel;
- (e) whereby as product material flows in the flow path from the inlet to the first and second product cavities, the flow device actuation assemblies are operative to
- 25 control the pressure, volumetric, and/or mass flow rate conditions of the product material filling the first and second product cavities during fill.

3. A process for making a part comprising a solidifiable product material, comprising:

(a) flowing the product material in a flow path;

5 (b) providing a flow channel comprising a portion of the flow path, the flow channel being adjacent to other portions of the flow path;

10 (c) altering the posture of the flow channel with respect to the adjacent portions of the flow path so that said flow channel is offset from said adjacent portions of the flow path;

15 (d) allowing said product material to solidify in said flow channel and adjacent portions of the flow path whereby said part is formed with an impression of said flow channel and said adjacent portions of said flow path; and

(e) said flow channel solidified material being offset with respect to said adjacent flow path portions' solidified material.

4 4. A solidified part produced by the process of claim 3.

5. A method of conditioning tooling having product cavities, comprising the steps of:

(a) setting flow channels of the tooling to initial positions;

5 (b) injecting product material into the tooling;

(c) inspecting the parts for quality; and

(d) adjusting the posture of the flow channels to effect product material conditions thereby avoiding short shots or over-packing.

10 6. The method of claim 5, wherein where the product comprises a short shot to a product cavity, a flow channel adjustment is made permitting increased flow of product material to the product cavity.

15 7. The method of claim 5, wherein where over-packing of a product cavity occurs, a flow channel adjustment is made for increased resistance to product material flow to the cavity.

20 8. The method of claim 5, wherein the adjustments made effect pressure, volumetric or mass flow rates of the product material.

9. The method of claim 5, wherein the adjustments are made manually.

10. The method of claim 5, wherein the adjustments are made by a supervisory process controller.

11. An intelligent control system loop for controlling fill of product cavities, comprising:

- (a) a supervisory process controller having a given set of product requirements programmed therein; and
- 5 (b) the controller sends a control signal to a tooling controller, the tooling controller compels tooling adjustments to be made in a flow device, the tooling adjustments comprising an adjustment posture of flow channels of the tooling via a flow device actuation
- 10 assembly.

12. The method of claim 11, wherein the controller sends a control signal to a manufacturing equipment controller to compel manufacturing equipment adjustments to be made to effect the pressure and temperature of the product

15 material.

13. The method of claim 12, wherein a plant performs product manufacture of a part in the tooling and simultaneous process monitoring takes place.

14. The method of claim 13, wherein process monitoring

20 data is fed back to the controller after analysis by an intelligent process evaluation comprising a process comparator function.

15. The method of claim 14, evaluating product quality and measurement data and feeding it to controller.

add
A2